RESULTS OF THE 2011 NATIONAL WETLAND CONDITION ASSESSMENT IN CALIFORNIA

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at Moss Landing Marine Laboratories

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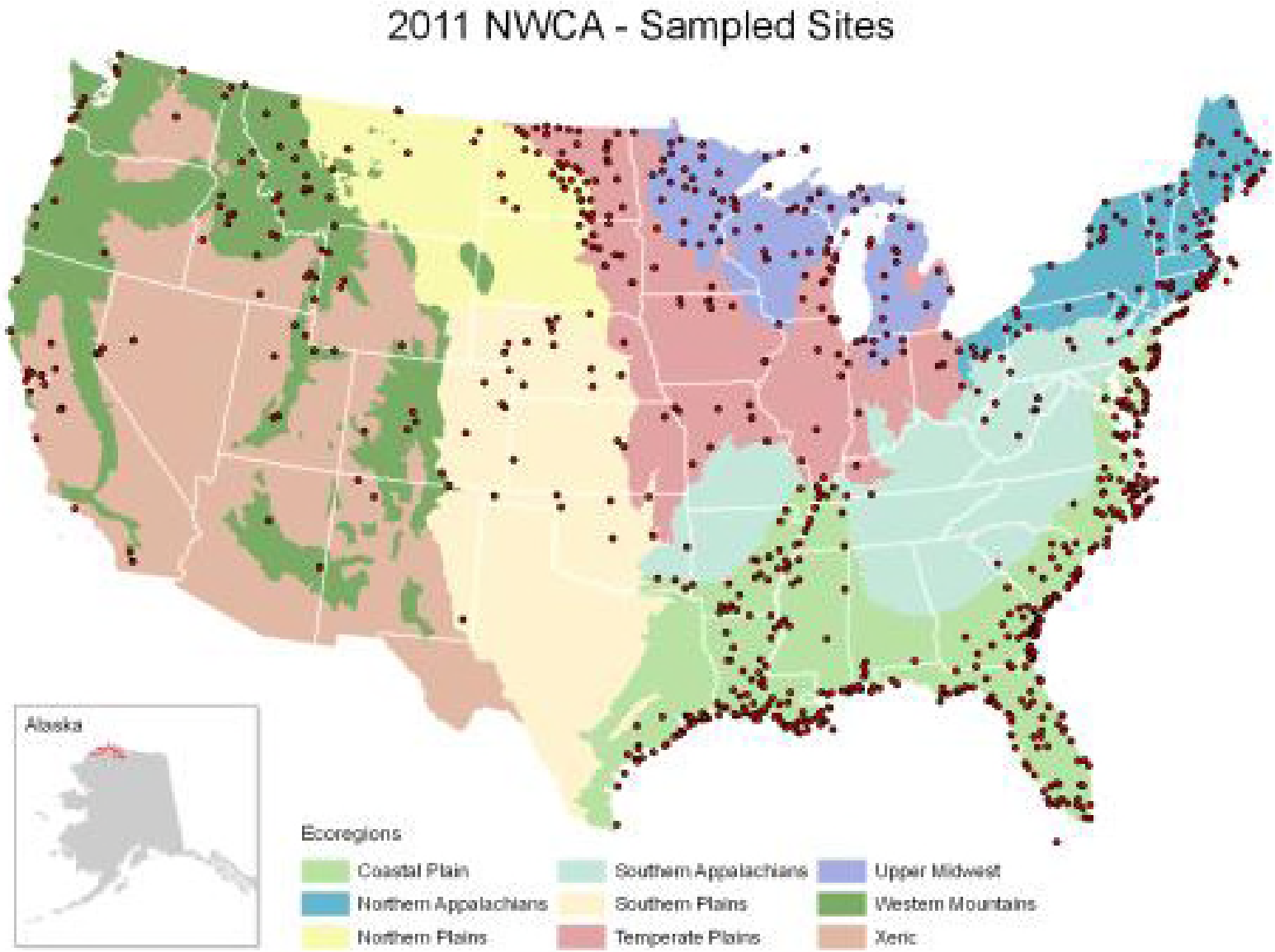
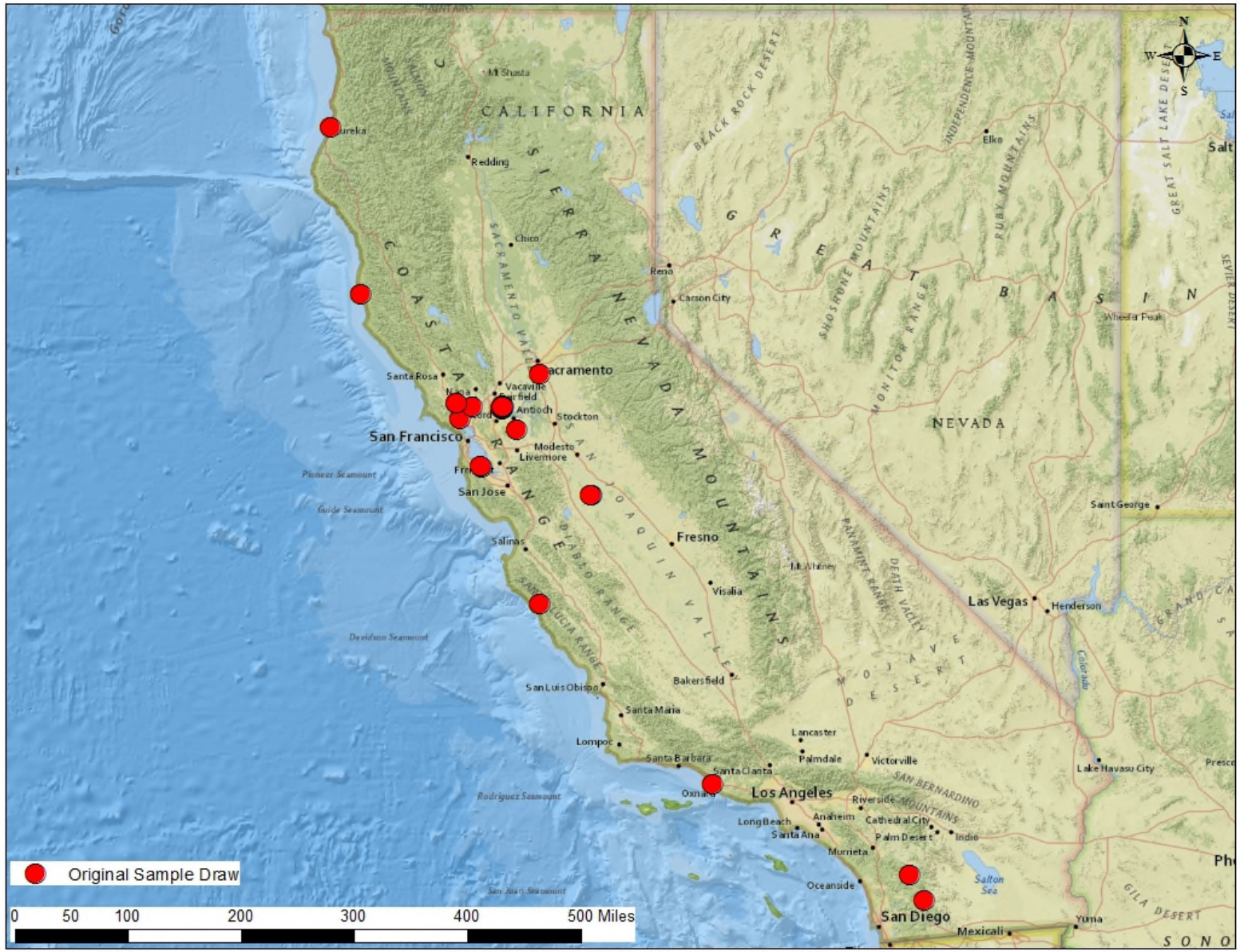
2011 NATIONAL WETLAND CONDITION ASSESSMENT

- First nationwide survey of wetlands
- Sampled many parameters of condition:
  - Vegetation
  - Soils
  - Hydrology
  - Algae
  - Water chemistry
  - Buffer
  - USA Rapid Assessment Method
- California Rapid Assessment Method added in California

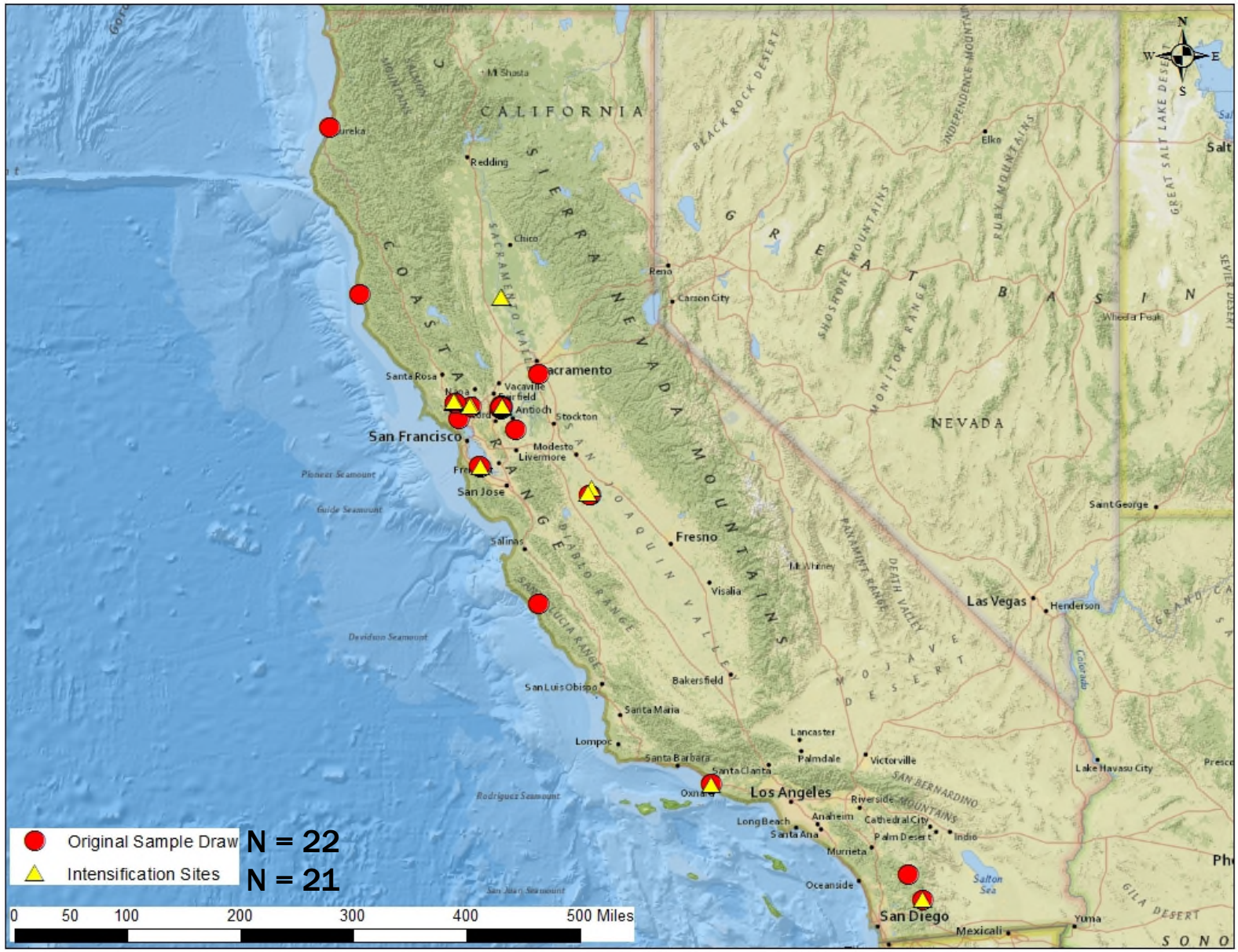
NATIONWIDE MAP OF SITES



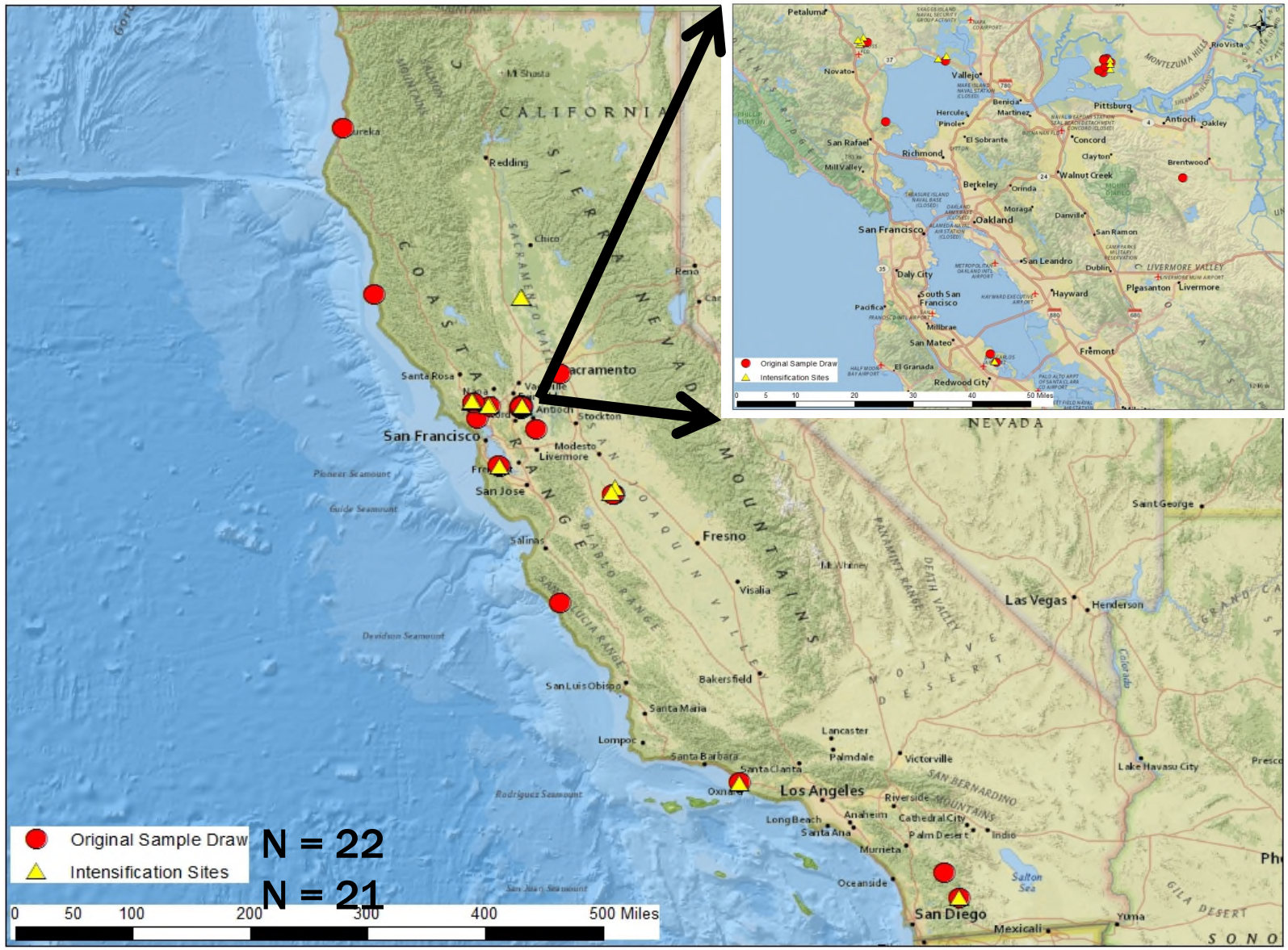
INITIAL SAMPLE DRAW FOR CALIFORNIA



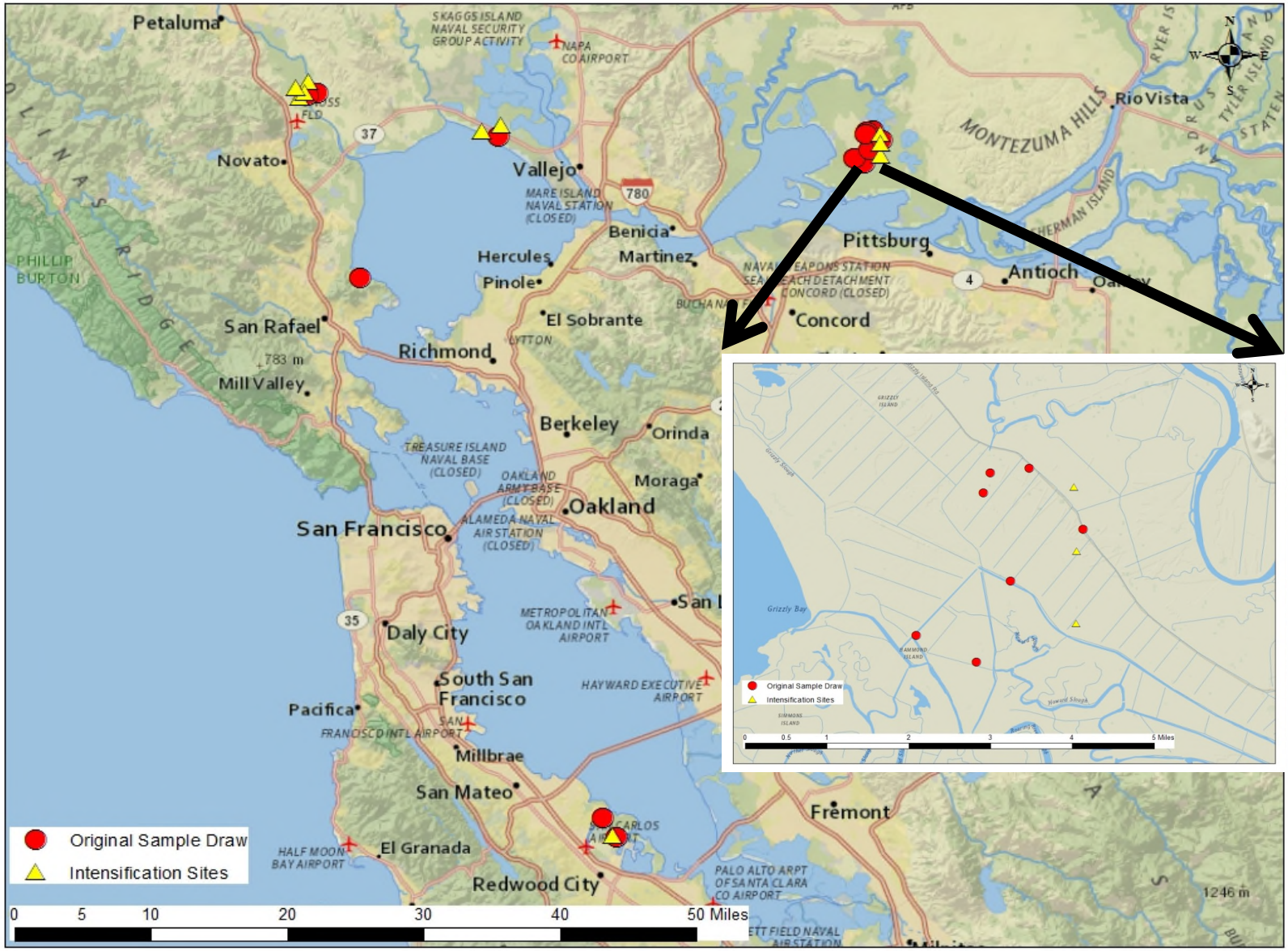
INTENSIFICATION SITES ADDED



CONCENTRATED IN BAY AREA



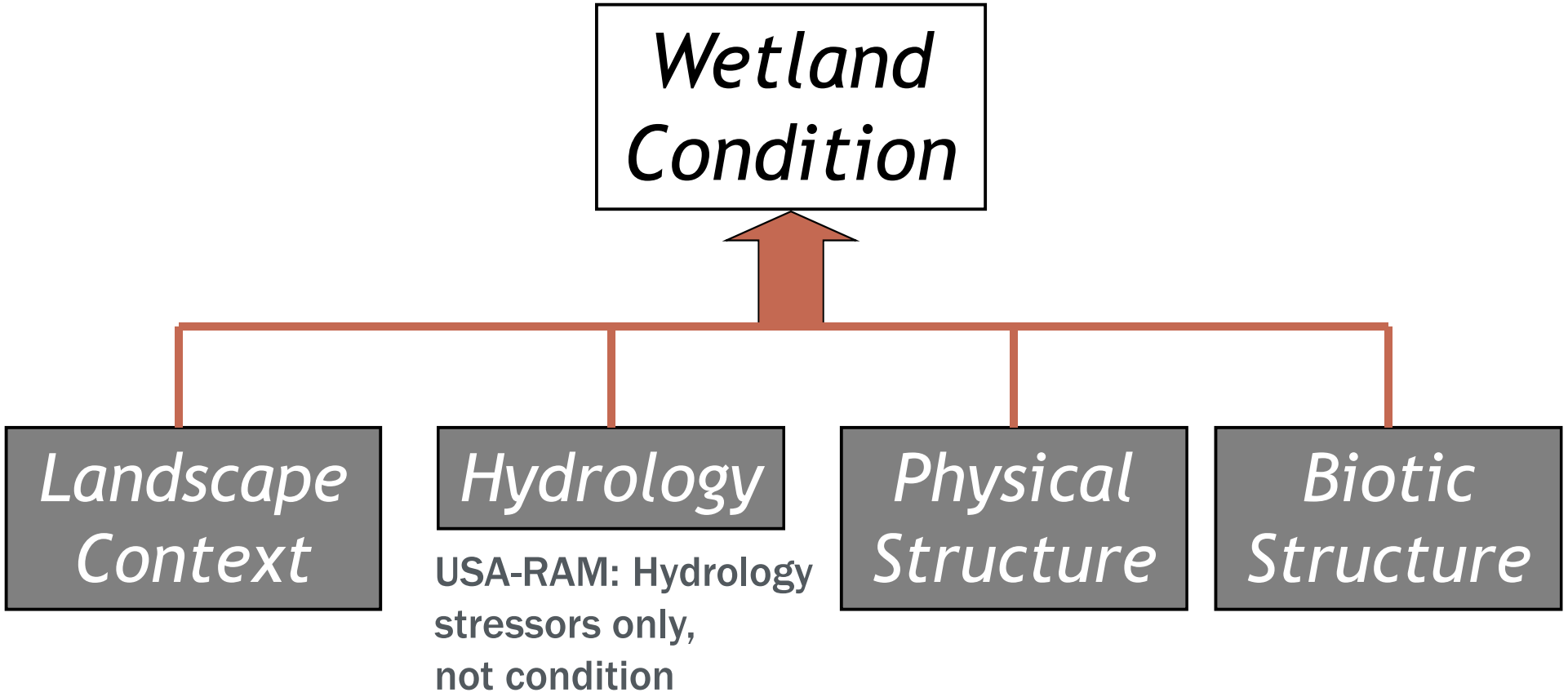
CLUSTERED IN LARGE WETLAND COMPLEXES (GRIZZLY ISLAND)



USA-RAM AND CRAM

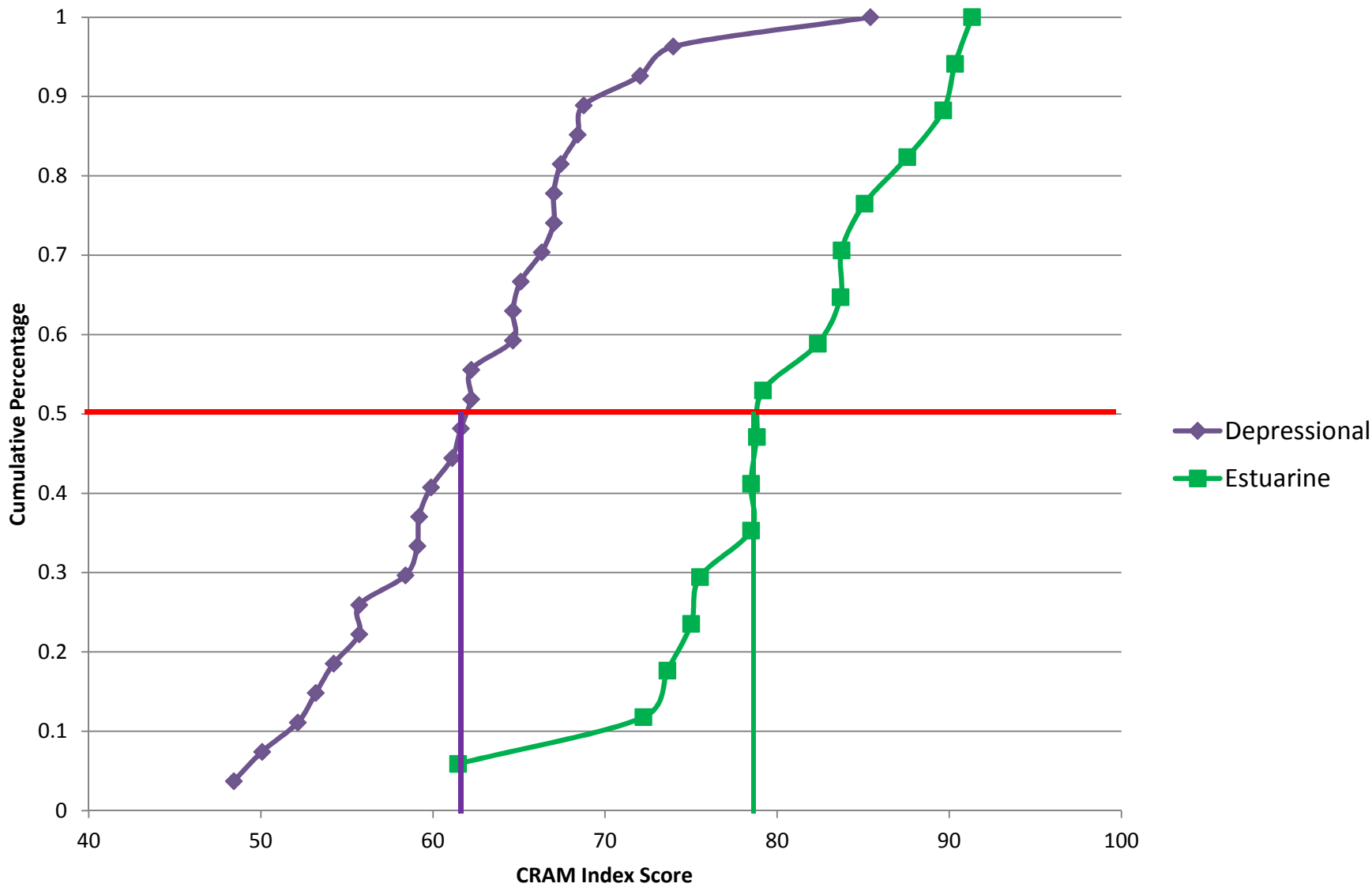
- Rapid Assessment Methods (RAMs)
- California's NWCA intensification used both methods (in addition to all standard NWCA methods)
- USA-RAM assesses all wetland types with one method, CRAM has modules for different types
- USA-RAM quantifies stressor severity, CRAM has a qualitative stressor checklist
- Both look at 4 Attributes

RAM DESIGN: ATTRIBUTES

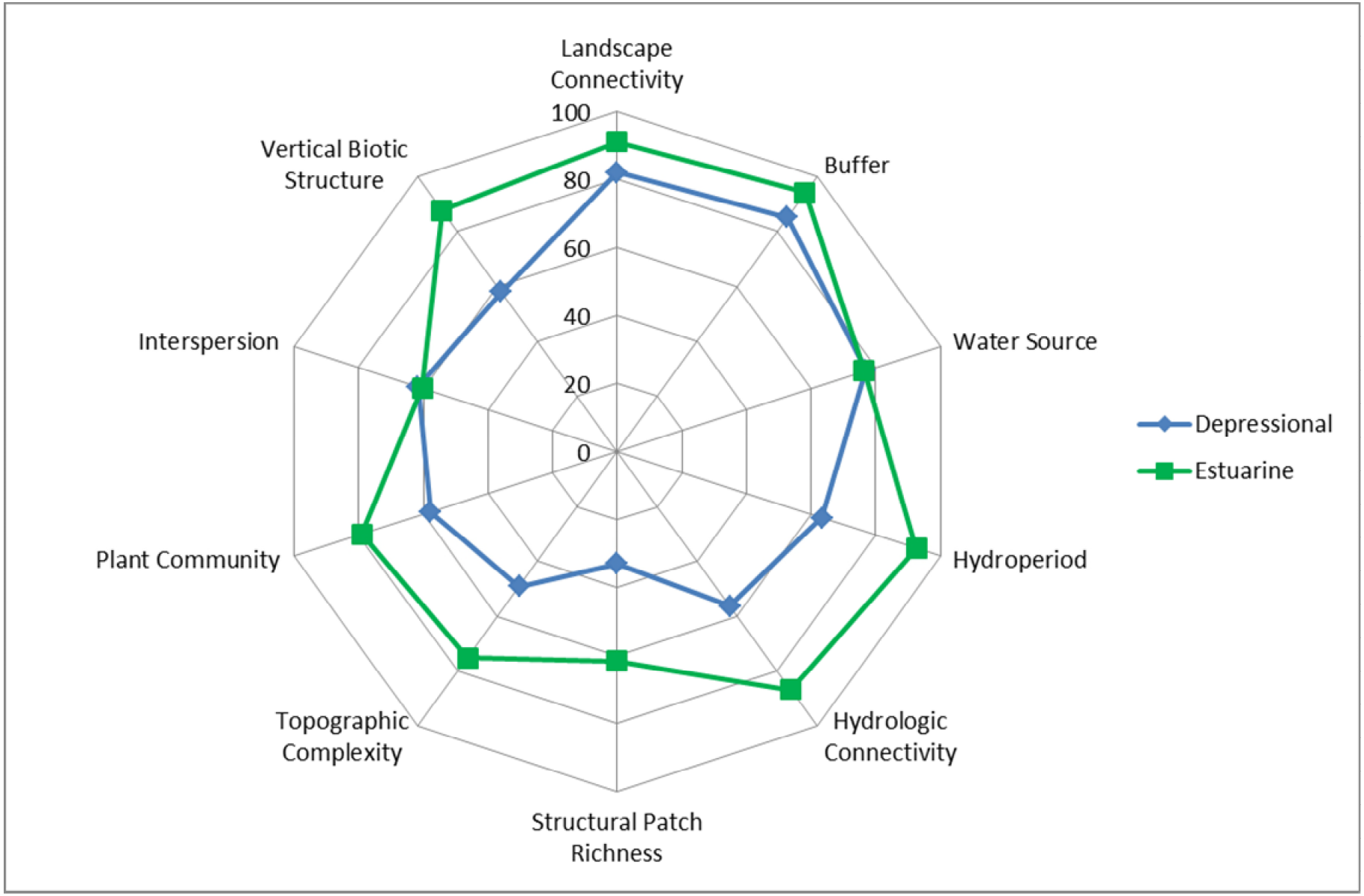


- Each attribute is represented by 1 or more metrics in both USA-RAM and CRAM

DEPRESSIONAL AND ESTUARINE RANGE OF CRAM SCORES (CFD)



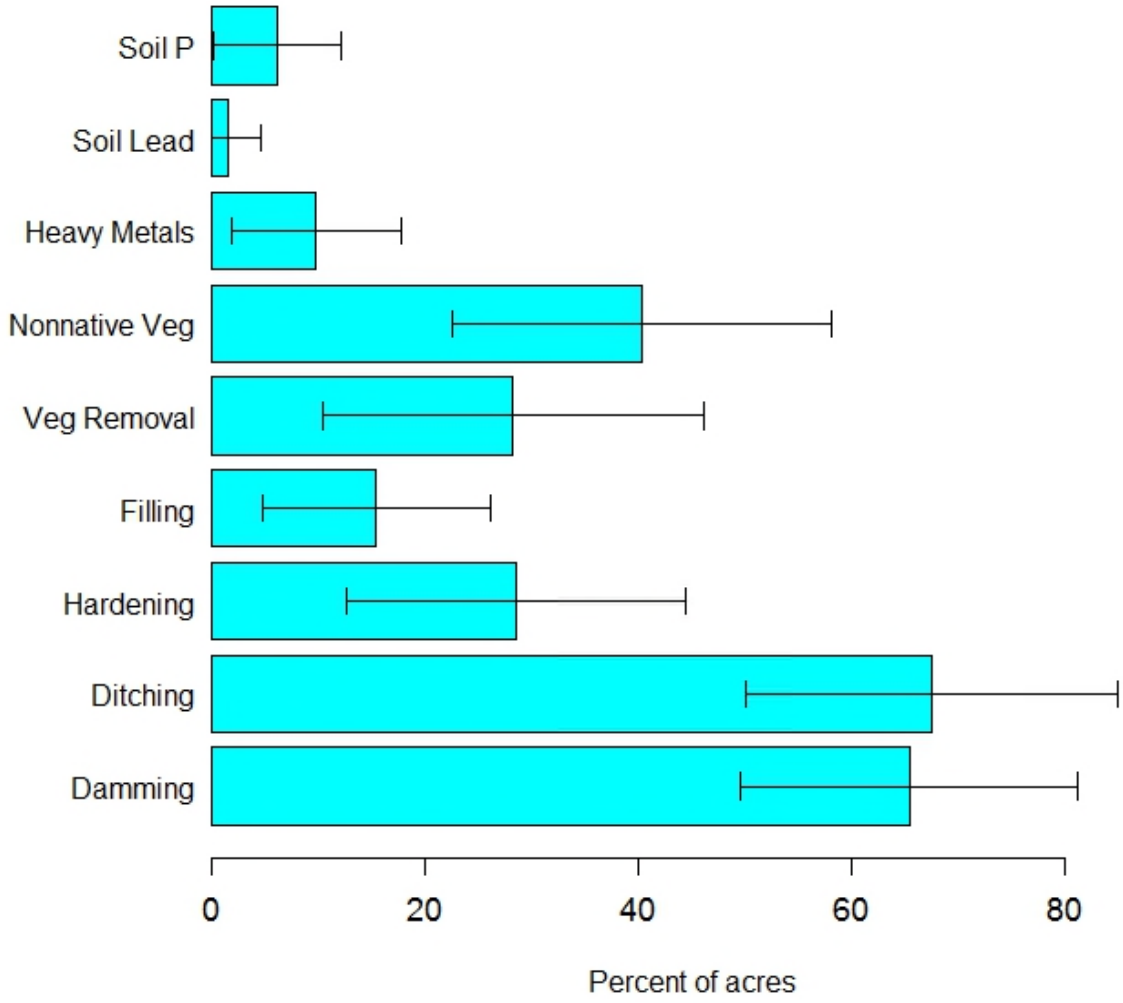
DEPRESSIONAL AND ESTUARINE CRAM METRIC SCORES



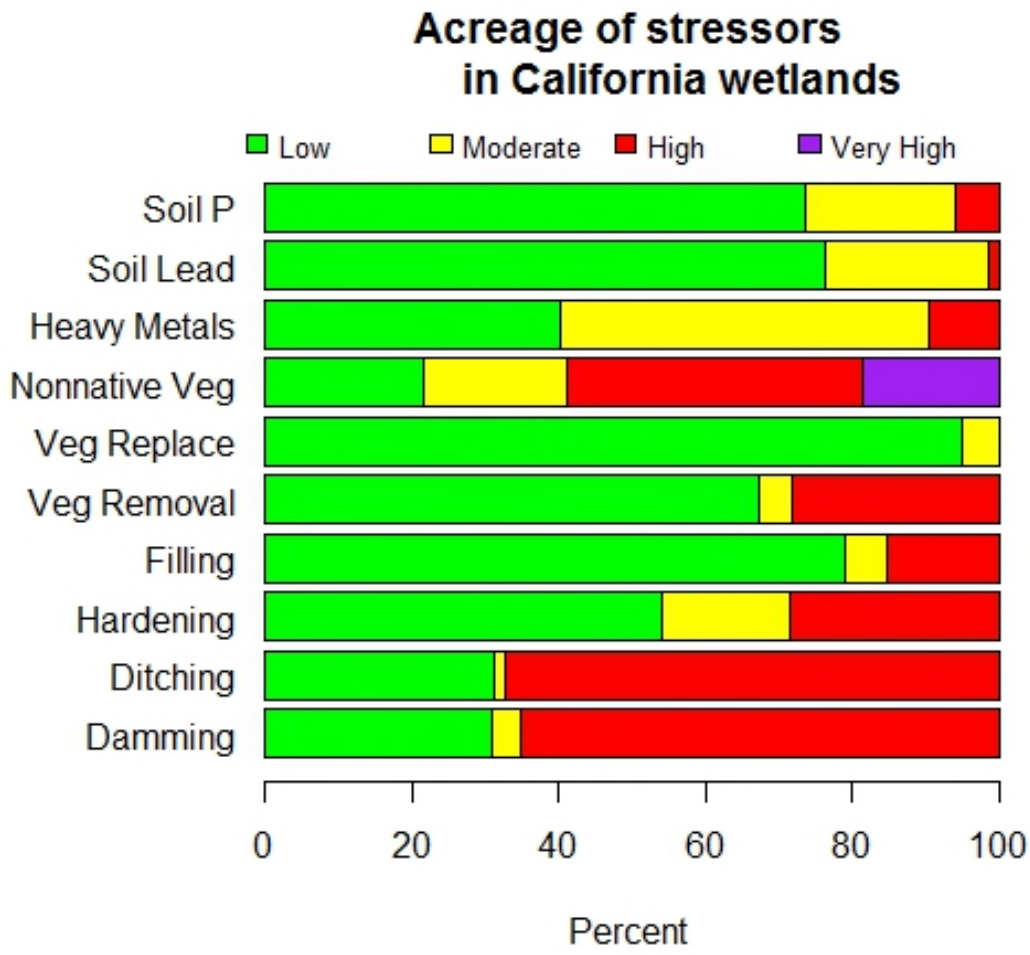
DEPRESSIONAL AND ESTUARINE COMPARISON OF CRAM SCORES

- Estuarine wetlands have overall higher scores
- Depressional wetlands had particularly low scores in Hydrology and Physical Structure metrics:
  - Hydroperiod
  - Hydrologic Connectivity
  - Structural Patch Richness
  - Topographic Complexity

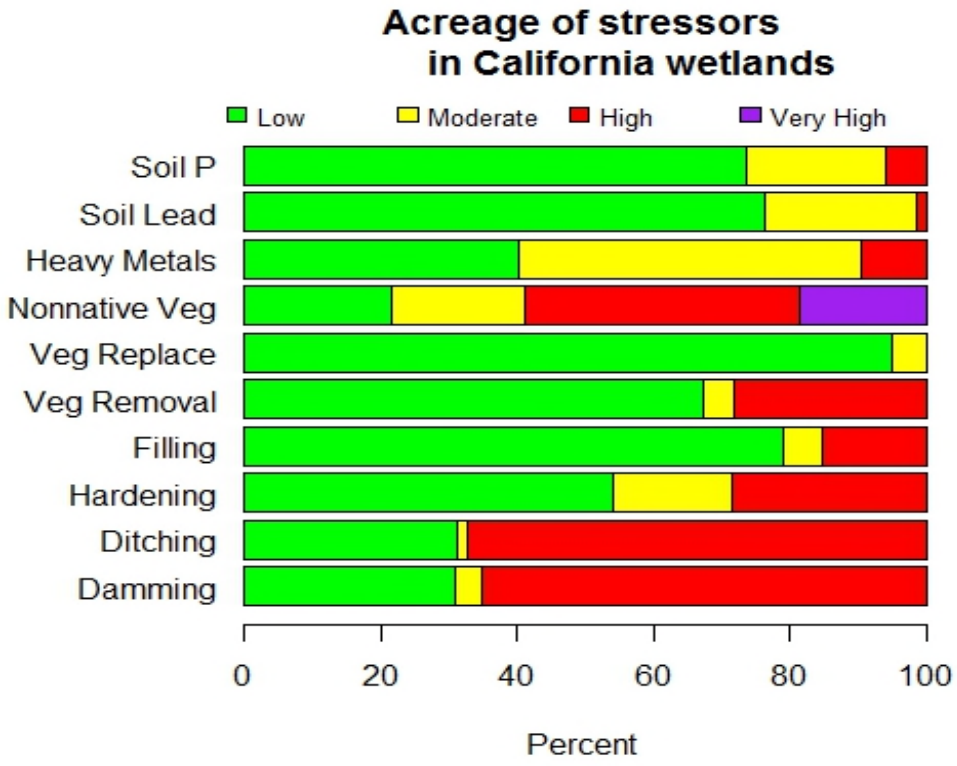
EXTENT OF HIGH STRESS ACREAGE IN CALIFORNIA

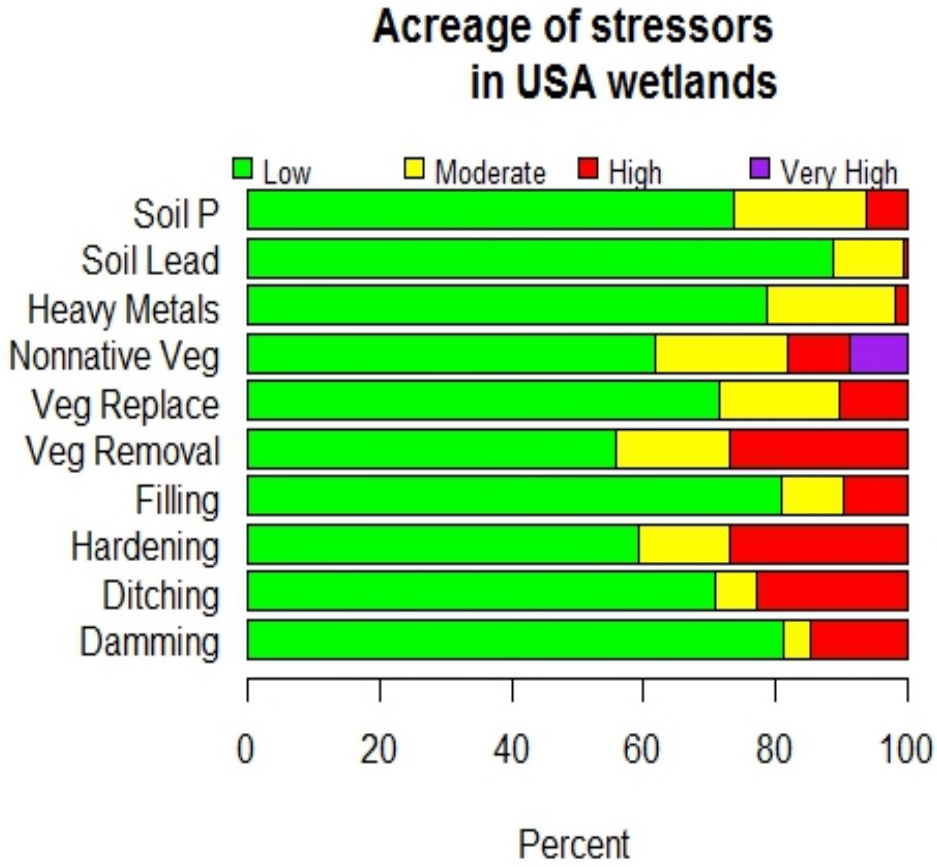


STRESSOR CLASSES BY ACREAGE



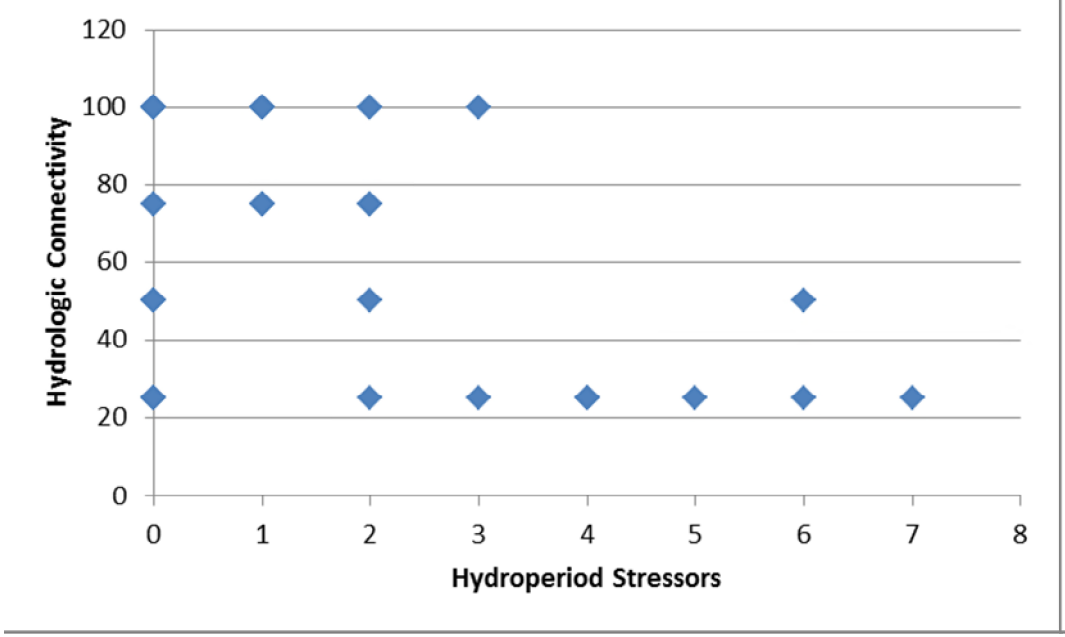
CALIFORNIA VS. USA



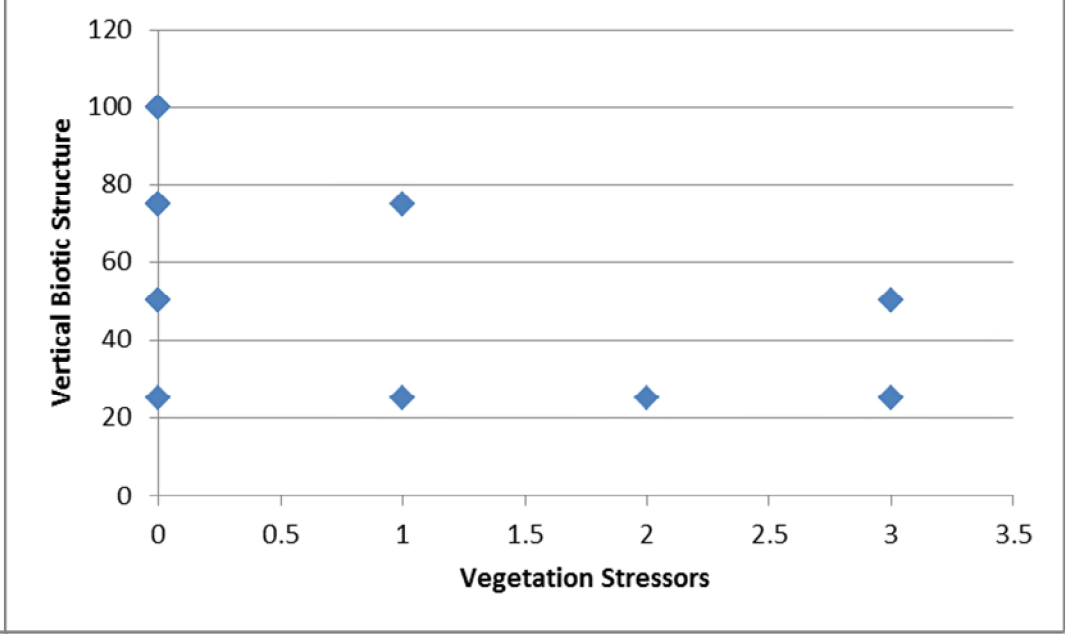


CORRELATION BETWEEN STRESSORS AND CONDITION METRICS

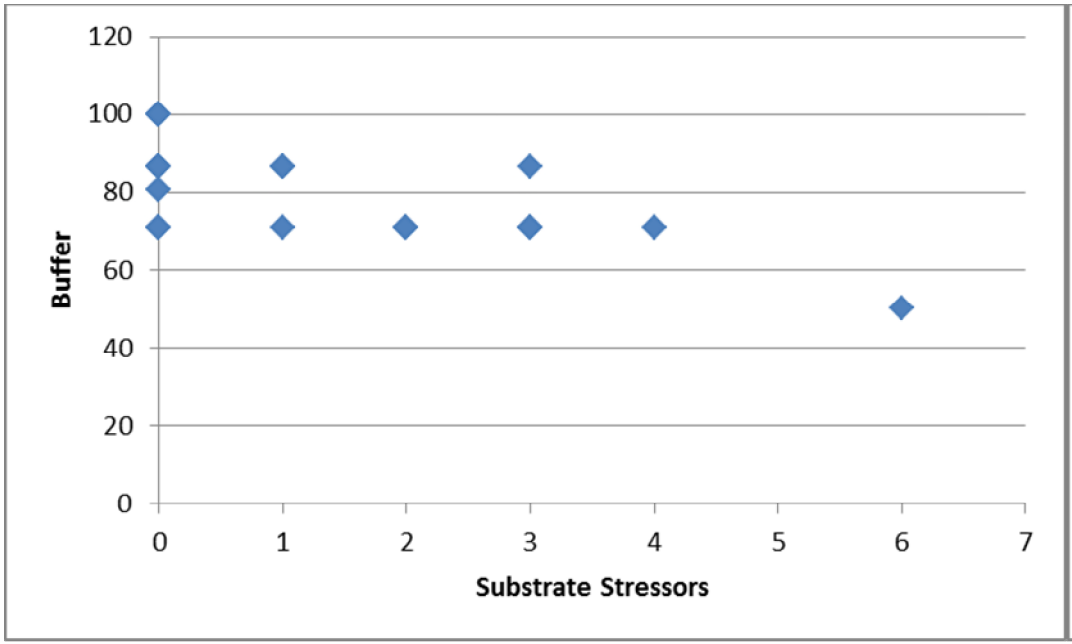
- Stressor indices from USA-RAM
- Condition metrics from CRAM
- Relationship may indicate causes and effects



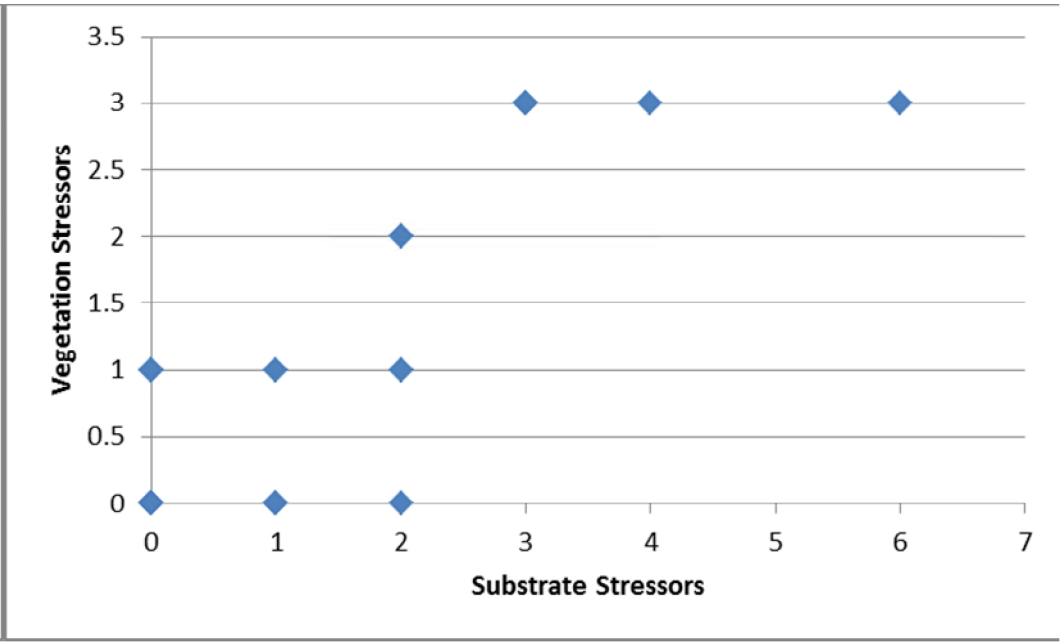
Pearson's *r* = -.427, p = .003, N = 45



r = -.544, p = .0001, N = 45



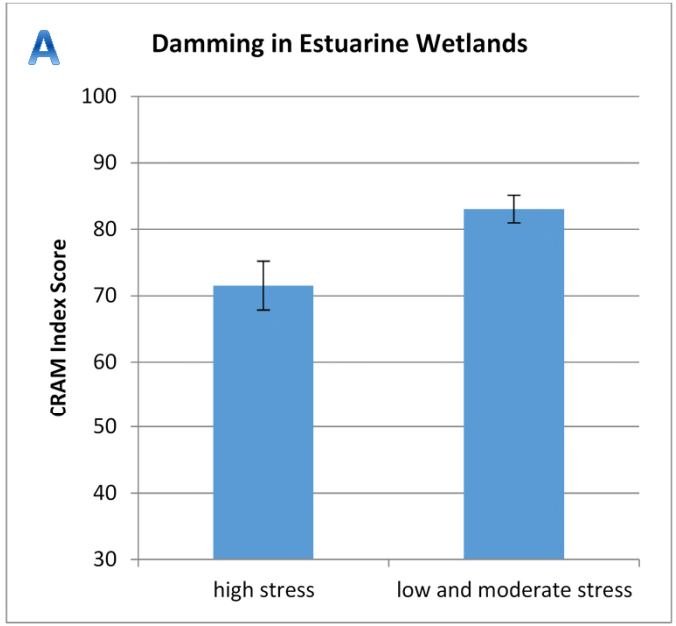
r = -.701, p = .0000, N = 45

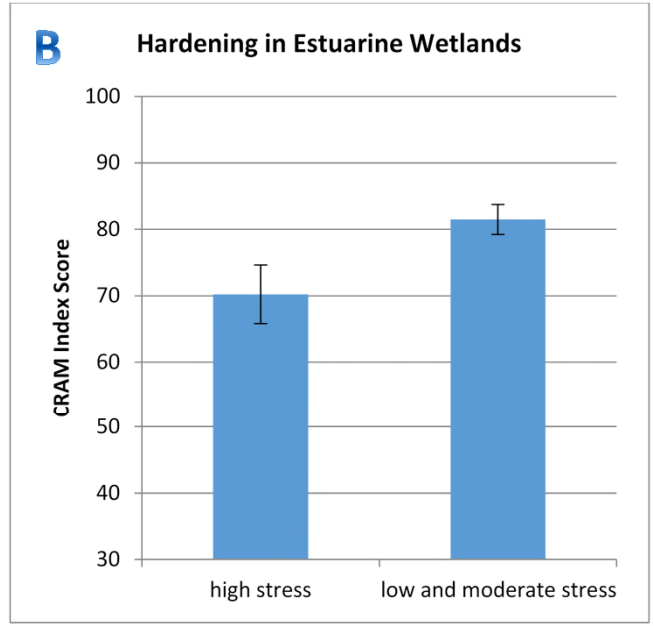


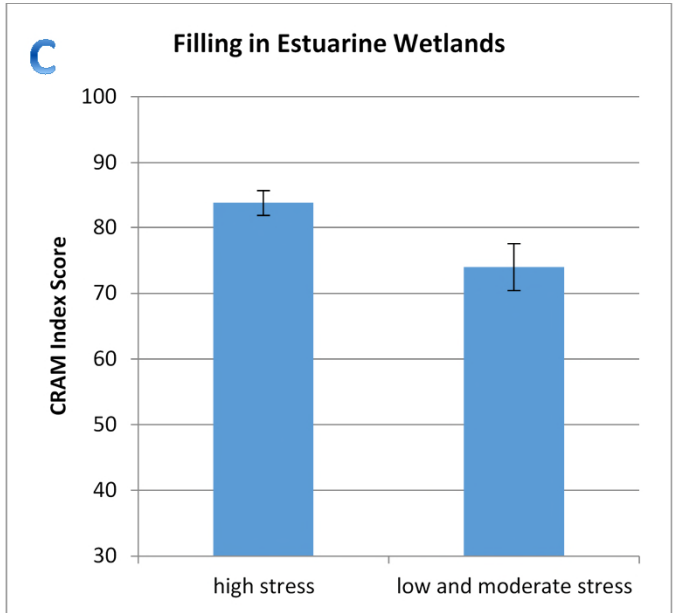
r = .885, p = .0000, N = 45

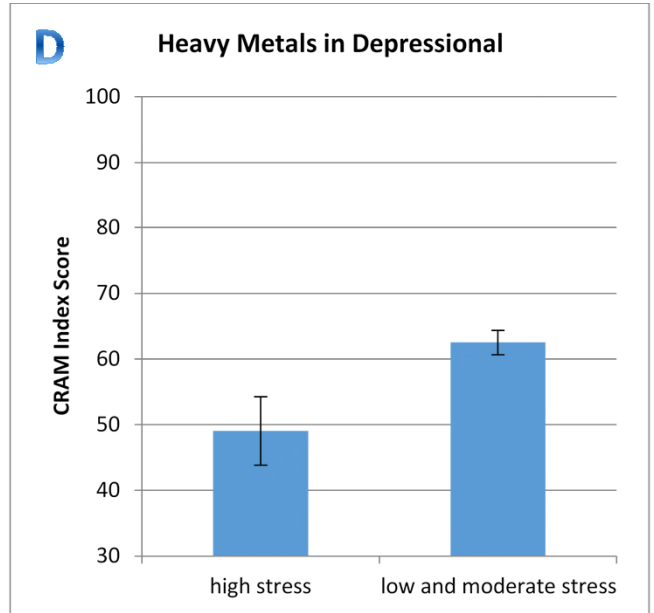
STRESSOR LEVELS AND CRAM SCORES

- ANOVA test
- High stress compared to low and moderate stress combined
- All significant at $p < 0.05$
- Some unexpected findings
- All other stressor ANOVAs not significant



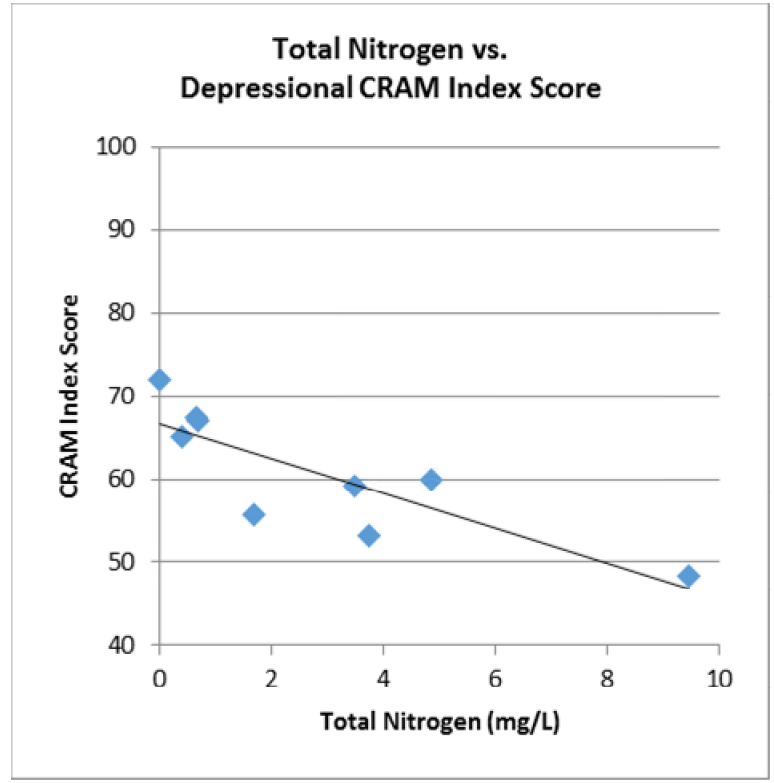






COMPARING LEVEL 2 AND LEVEL 3 DATA

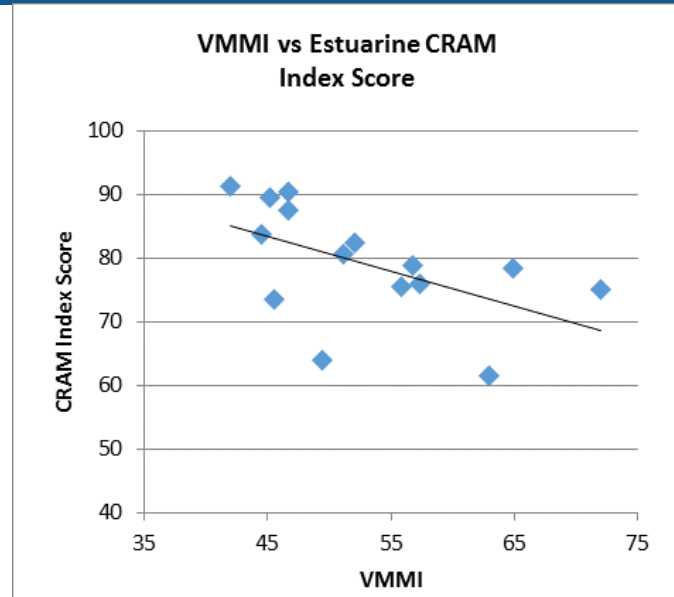
- Depressional wetlands
- Significant correlation between CRAM Index score and TN (p = 0.1), and the soil heavy metal index (p = 0.1)
- Significant correlation between several of the CRAM attributes and NWCA data

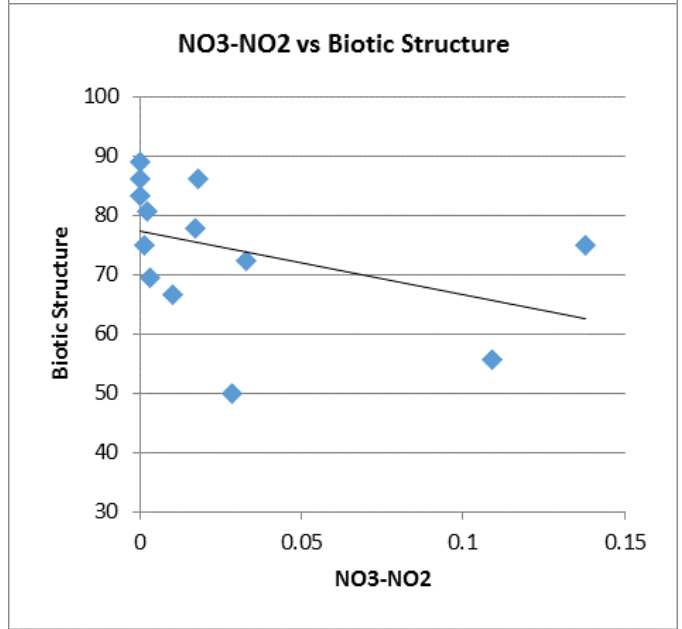


Correlation	Test	Stat	P-value
Index Score vs. Heavy Metal Index	Kendall	**-0.3746**	**0.0140**
Index Score vs. Total Nitrogen	Pearson (log)	**-0.7665**	**0.0097**
Hydrology vs. Heavy Metal Index	Kendall	**-0.5492**	**0.0007**
Biotic vs. Relative Frequency of Non-natives	Kendall	**-0.3225**	**0.0198**
Biotic vs. Heavy Metal Index	Kendall	**-0.3096**	**0.0480**

COMPARING LEVEL 2 AND LEVEL 3 DATA

- Estuarine wetlands
- Significant correlation between CRAM Index score and VMMI
- Significant correlation between several of the CRAM attributes and NWCA data
- Not always the expected correlations





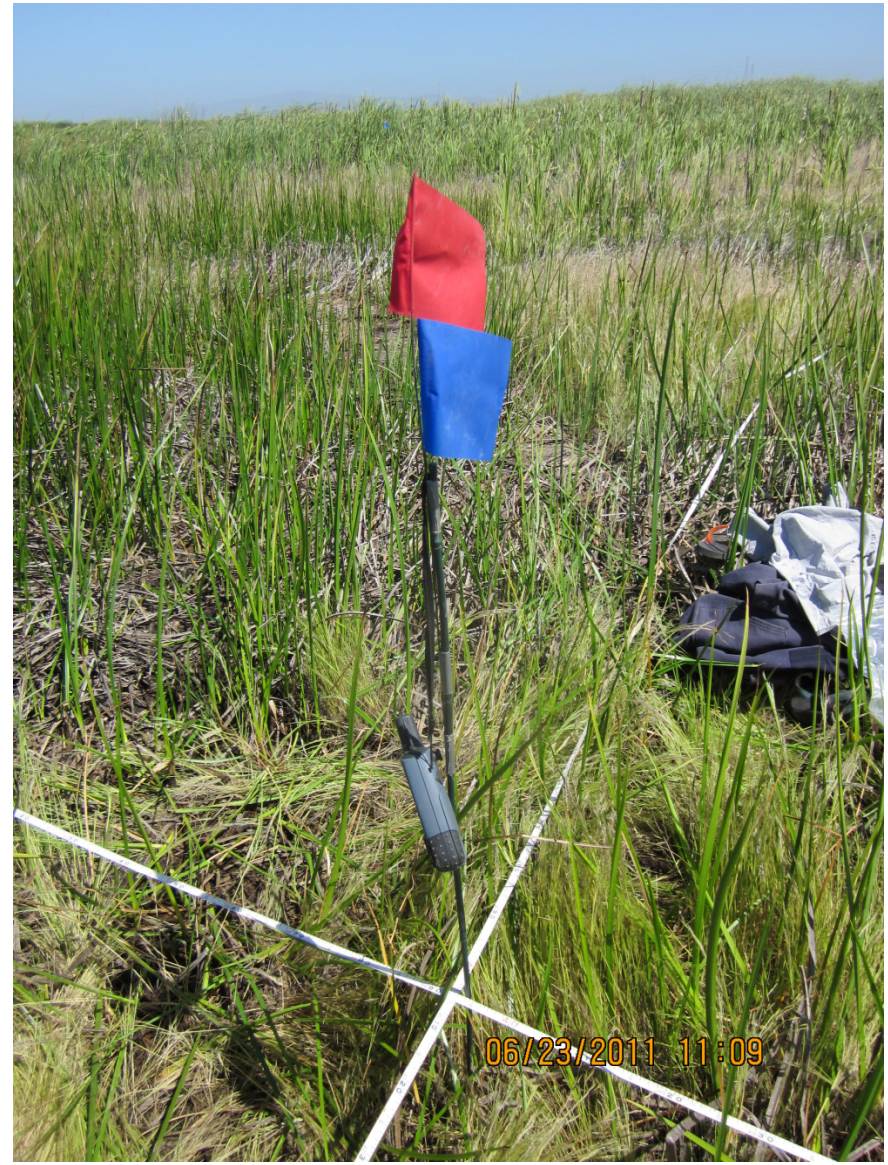
COMPARING LEVEL 2 AND LEVEL 3 DATA

Correlation	Test	Stat	P-value
Index Score vs. VMMI	Pearson	-0.5349	0.0399
Index Score vs. Total Number of Non-natives	Kendall	0.4395	0.0376
Buffer and Landscape vs. Relative Frequency of Non-natives	Kendall	**-0.6013**	**0.0062**
Buffer and Landscape vs. Total Number of Non-natives	Kendall	**-0.5551**	**0.0149**
Buffer and Landscape vs. Relative Cover of Non-natives	Kendall	**-0.5367**	**0.0142**
Buffer and Landscape vs. NO_3NO_2	Kendall	0.5869	0.0120
Buffer and Landscape vs. Total Phosphorous	Kendall	**-0.6066**	**0.0085**
Hydrology vs. Relative Frequency of Non-natives	Kendall	0.4849	0.0261
Hydrology vs. Total Number of Non-natives	Kendall	0.5483	0.0152
Hydrology vs. Relative Cover of Non-natives	Kendall	0.4338	0.0455
Physical vs. Relative Frequency of Non-natives	Kendall	0.4551	0.0374
Physical vs. Relative Cover of Non-natives	Kendall	0.5000	0.0216
Biotic vs. Total Number of Non-natives	Kendall	0.4366	0.0419
Biotic vs. Relative Cover of Non-natives	Kendall	0.4126	0.0454
Biotic vs. NO_3NO_2	Kendall	**-0.4636**	**0.0309**

BOLD statistics = expected correlation

PLANNING FOR 2016

- Improved sample frame
- Increased site allocation for the West
- Streamlined sampling protocols
- Lessons learned from 2011




Thank you